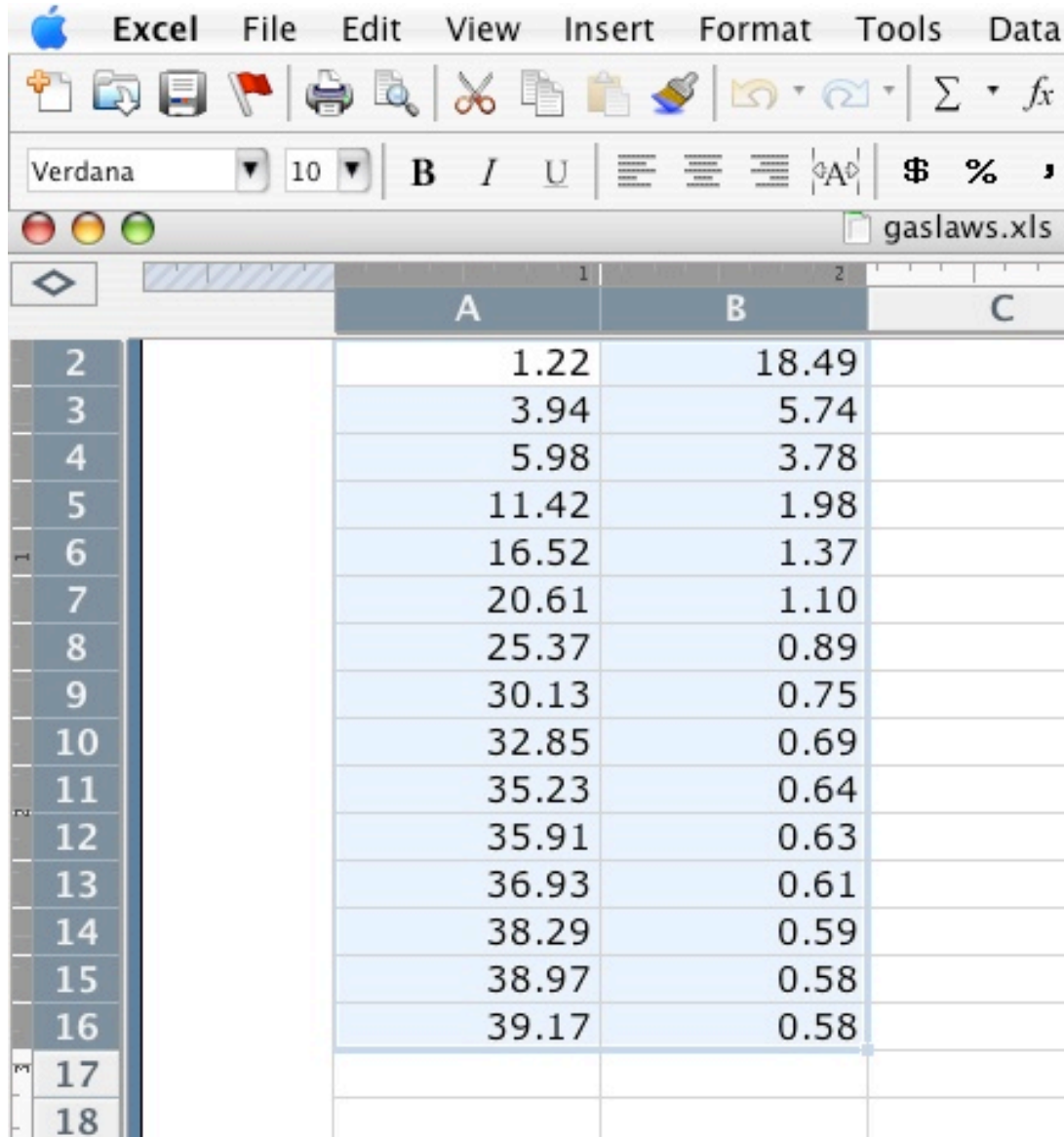


HOW TO GRAPH DATA ON EXCEL

All of our chemistry data will use the same type of graph on Excel. Follow these instructions to plot your data, add a line of best fit, and get an equation for the line!

INPUTTING DATA INTO EXCEL:

1. Open Microsoft Excel (the big green "X") in the Apple Dock.
2. Type in your data, with your X axis data (independent variable) in the left-hand column, and your Y axis data (dependent variable) in the right column. Highlight your data.

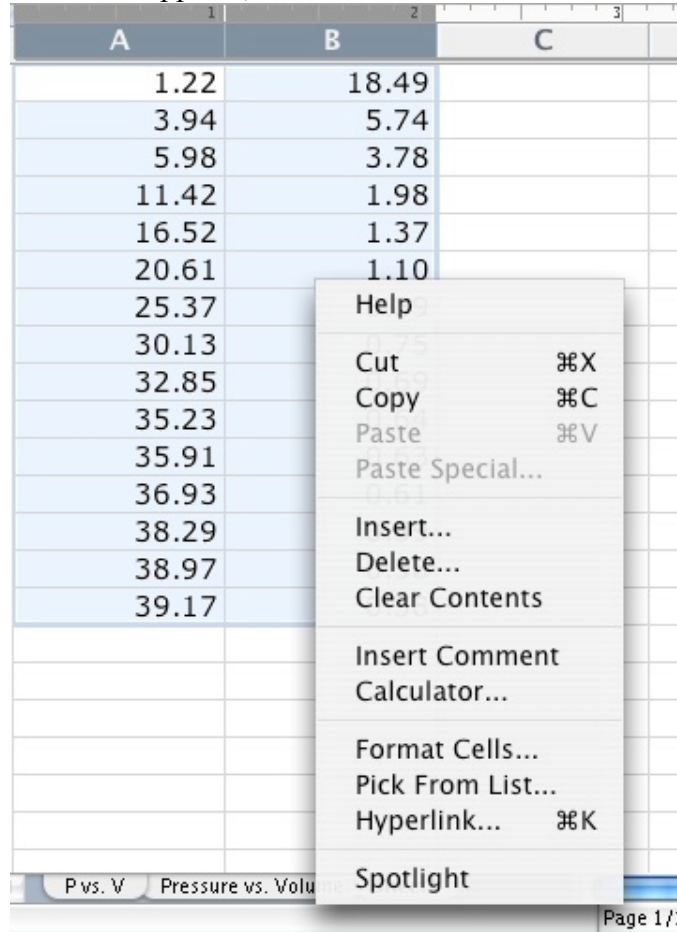


The screenshot shows the Microsoft Excel application window. The menu bar includes Excel, File, Edit, View, Insert, Format, Tools, and Data. The toolbar contains icons for opening files, saving, printing, undo, redo, and formulas. The font settings are set to Verdana, size 10. The file name is gaslaws.xls. The data is entered into columns A and B, starting from row 2. Column A contains values from 1.22 to 39.17, and column B contains values from 18.49 to 0.58. The data is highlighted in blue.

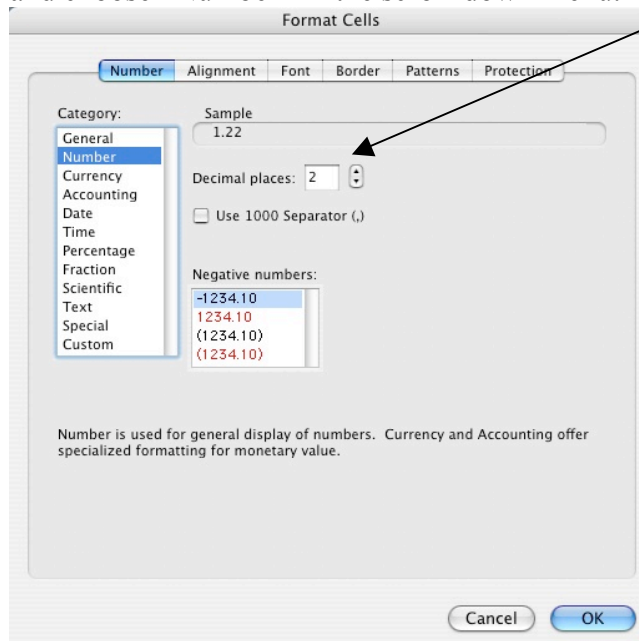
	A	B
2	1.22	18.49
3	3.94	5.74
4	5.98	3.78
5	11.42	1.98
6	16.52	1.37
7	20.61	1.10
8	25.37	0.89
9	30.13	0.75
10	32.85	0.69
11	35.23	0.64
12	35.91	0.63
13	36.93	0.61
14	38.29	0.59
15	38.97	0.58
16	39.17	0.58
17		
18		

*****NOTE:** It is the default function in Excel to plot whatever you type into the left-hand column as the X-axis values (independent variable) and whatever you type into the right-hand column as the Y-axis values (dependent variable).

3. Place your cursor over one of the data cells. Control click. In the drop-down menu that appears, choose “Format Cells.”



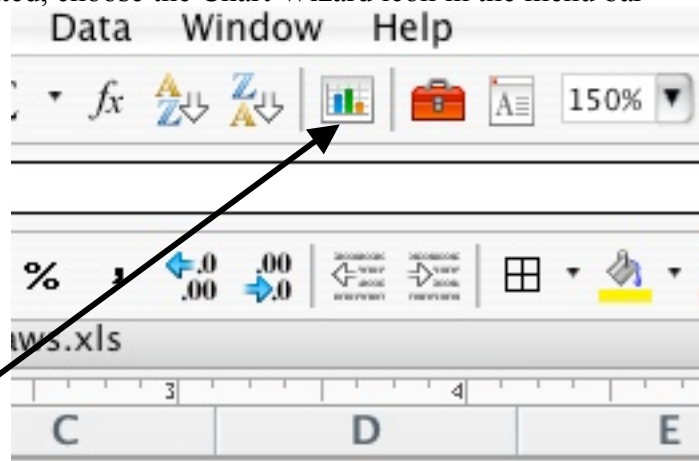
Then click on the “Number” tab, and choose “Number” in the scroll-down menu. Type in “2”



decimal places.

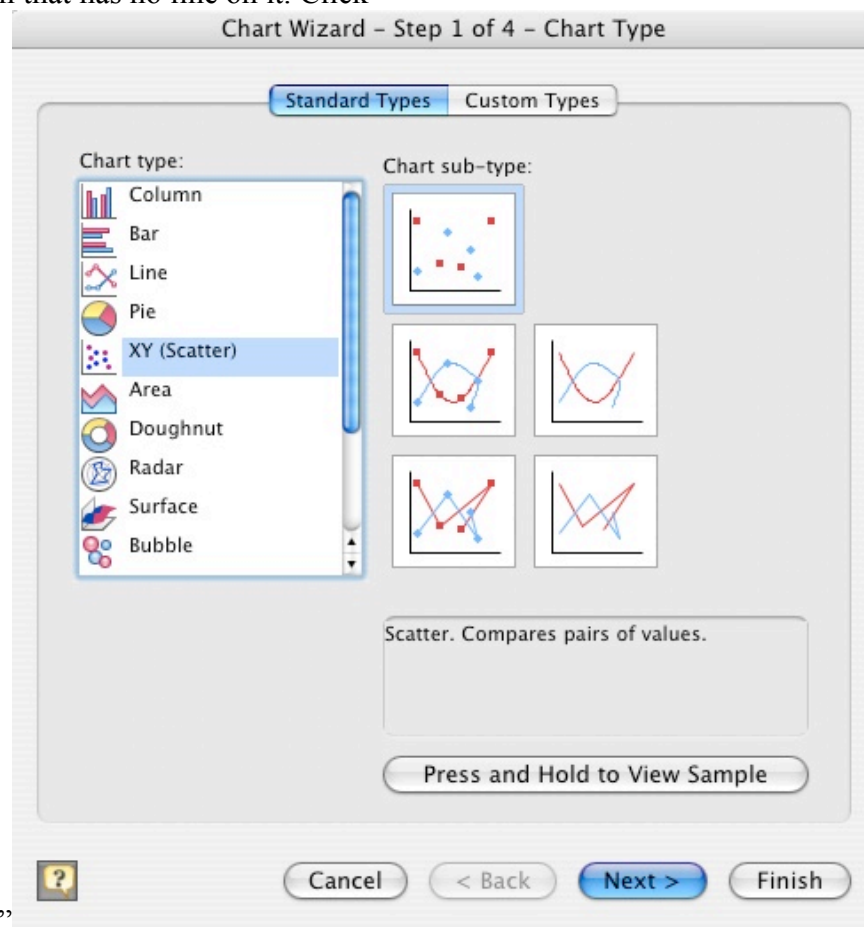
MAKING A GRAPH OF YOUR DATA:

4. With data still highlighted, choose the Chart Wizard icon in the menu bar



(looks like a bar graph).

5. Choose “Scatterplot” as your type of graph, and choose the highlighted version that has no line on it. Click



“next.”

6. At Step 2 (Source Data), click “Next.”

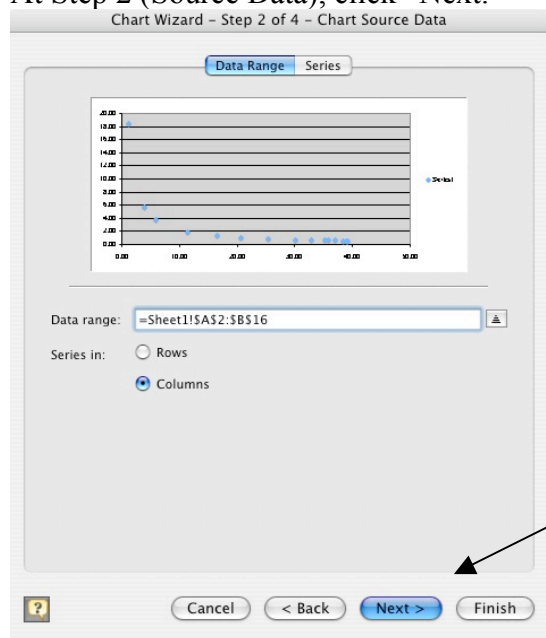


Chart Wizard – Step 2 of 4 – Chart Source Data

Data Range Series

Data range:

Series in:

☐ Rows

☒ Columns

Buttons: ? Cancel < Back Next > Finish

The screenshot shows the 'Chart Wizard - Step 2 of 4 - Chart Source Data' dialog box. It features a preview of a scatter plot with a downward trend. The 'Data range' is set to '=Sheet1!\$A\$2:\$B\$16'. Under 'Series in', the 'Columns' radio button is selected. At the bottom, there are buttons for '?', 'Cancel', '< Back', 'Next >', and 'Finish'. An arrow points to the 'Next >' button.

7. On Step 3 (Chart Options), title your graph (your dependent variable vs your independent variable), and label your X and Y axes, making sure you include units of measurement!

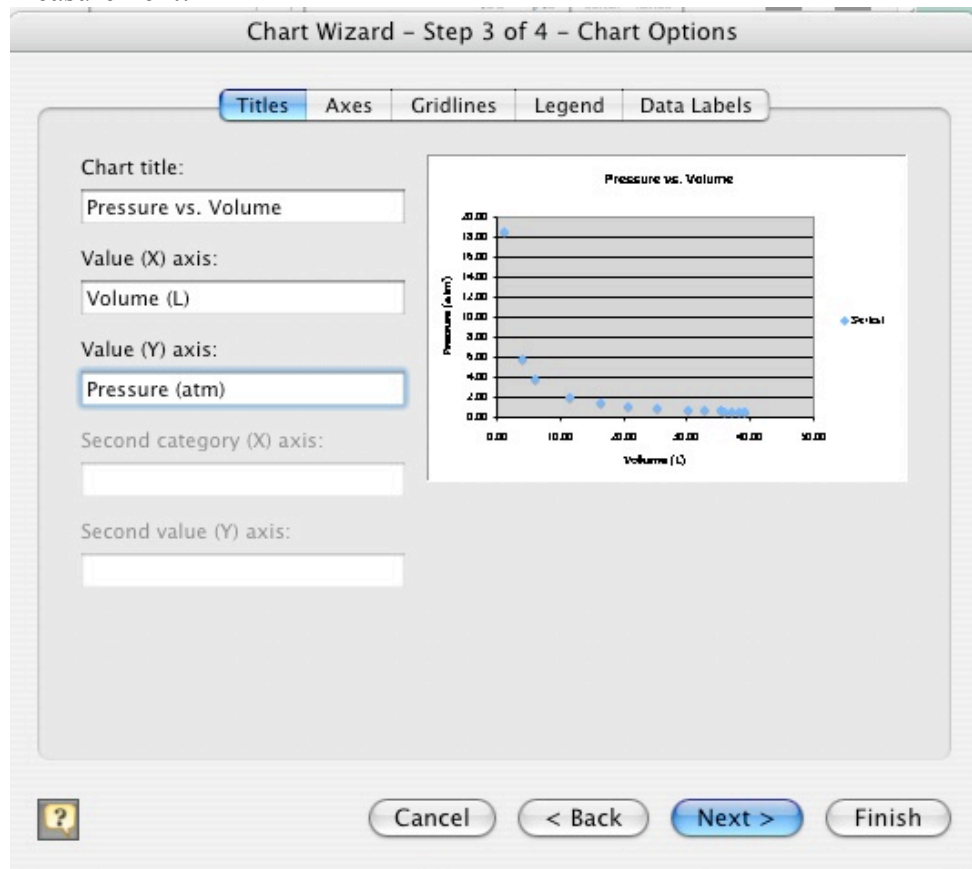


Chart Wizard – Step 3 of 4 – Chart Options

Titles Axes Gridlines Legend Data Labels

Chart title:

Value (X) axis:

Value (Y) axis:

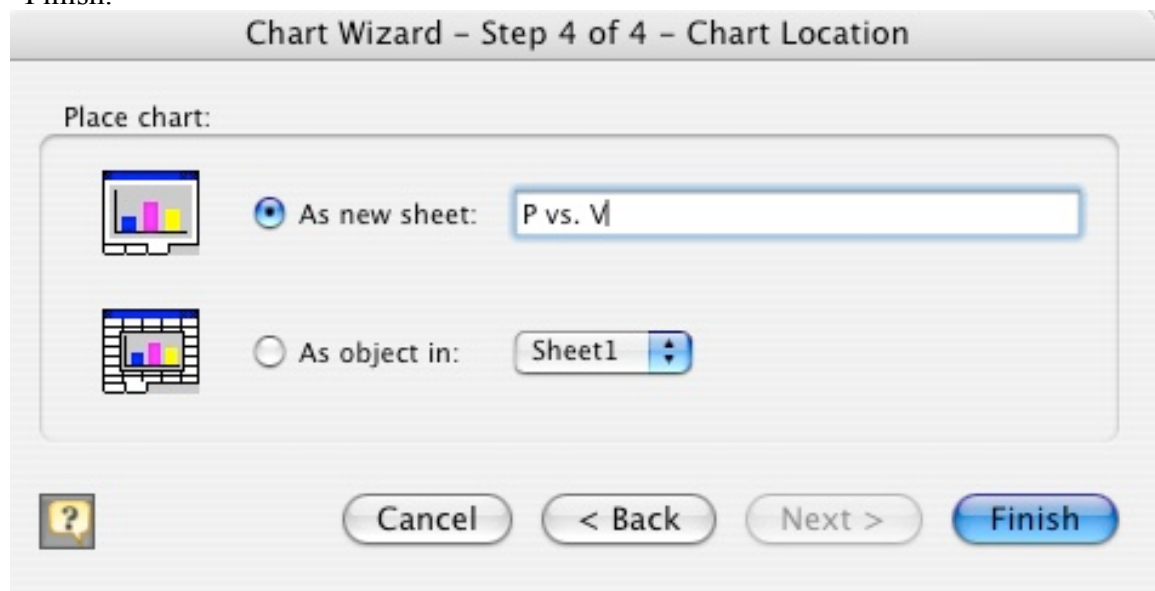
Second category (X) axis:

Second value (Y) axis:

Buttons: ? Cancel < Back Next > Finish

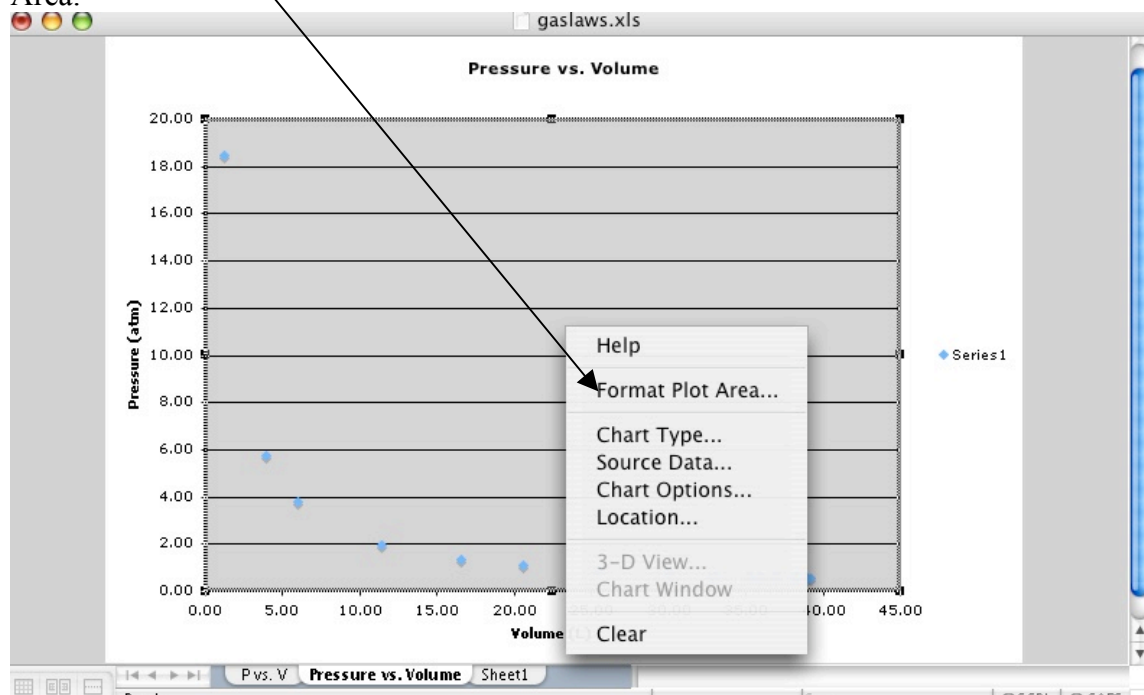
The screenshot shows the 'Chart Wizard - Step 3 of 4 - Chart Options' dialog box. The 'Titles' tab is active. The 'Chart title' is 'Pressure vs. Volume'. The 'Value (X) axis' is 'Volume (L)' and the 'Value (Y) axis' is 'Pressure (atm)'. A preview of the chart is shown on the right, with the title 'Pressure vs. Volume' and axes labeled 'Volume (L)' and 'Pressure (atm)'. At the bottom, there are buttons for '?', 'Cancel', '< Back', 'Next >', and 'Finish'.

8. Click “next,” and on Step 4 (Chart Location), save graph as a “New Sheet.” Change the name from “Chart 1” to a title that describes your graph. Click on “Finish.”

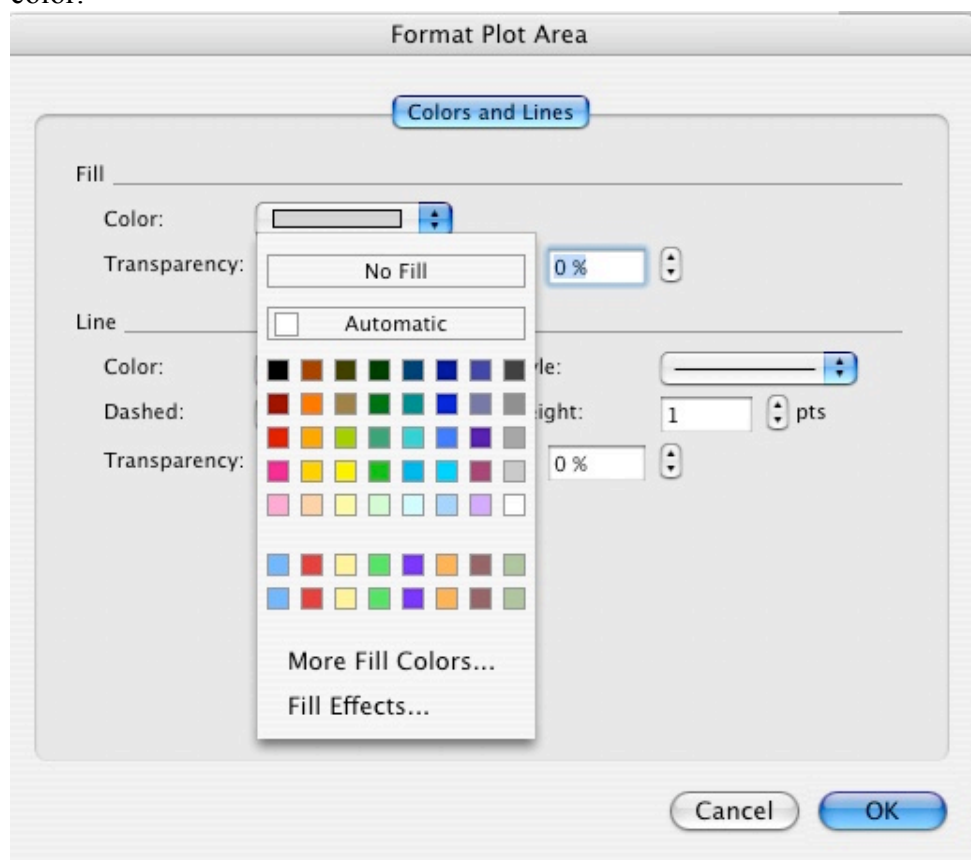


ADDING A TREND LINE AND EQUATION FOR THE LINE:

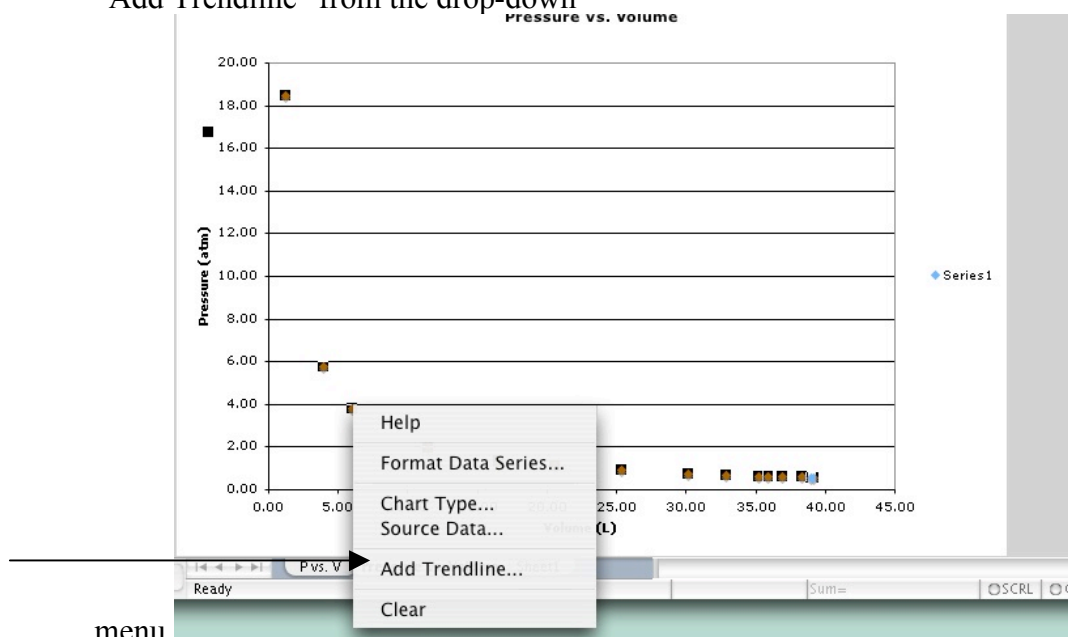
9. Now your points are plotted, but you need to make some modifications to make your graph printer-friendly, as well as add a trend line and equation. First, place your cursor on the plot area and Control-click. On the drop-down box, choose “Format Plot Area.”



10. Choose the “Colors and Lines” tab and click on “No Fill” under Fill color.

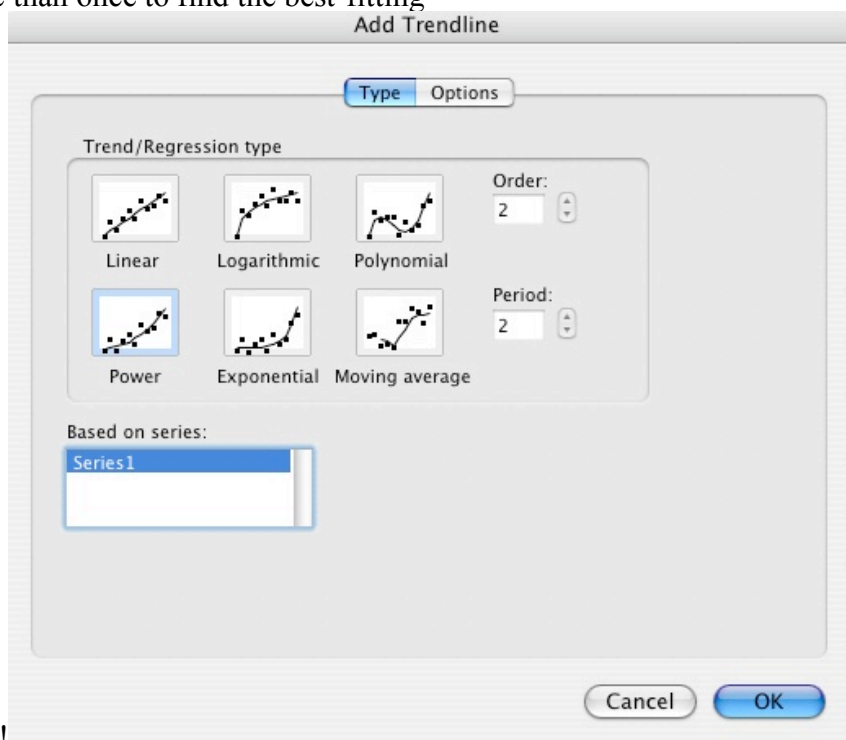


11. Now, you want to add a trend line. Put your cursor directly over a data point, so that the point coordinates pop up. Control-click on this point and choose “Add Trendline” from the drop-down



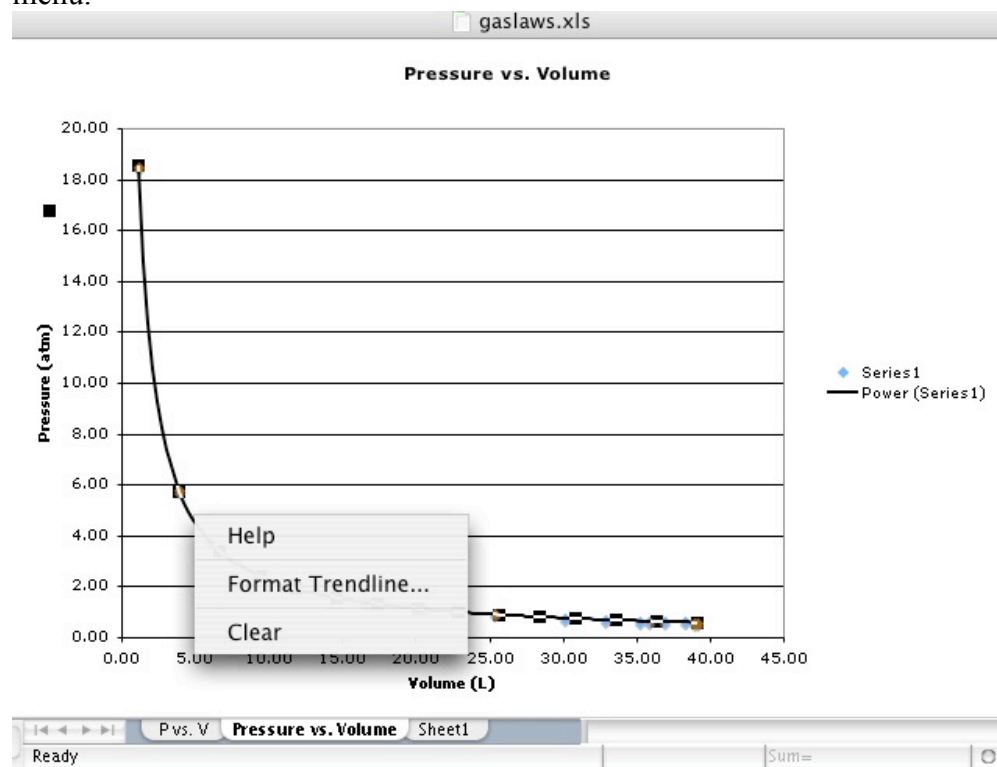
menu.

12. For Trendline Type, choose the type of line that appears to best match the pattern your points make. This may be trial-and-error – you may have to do this more than once to find the best-fitting

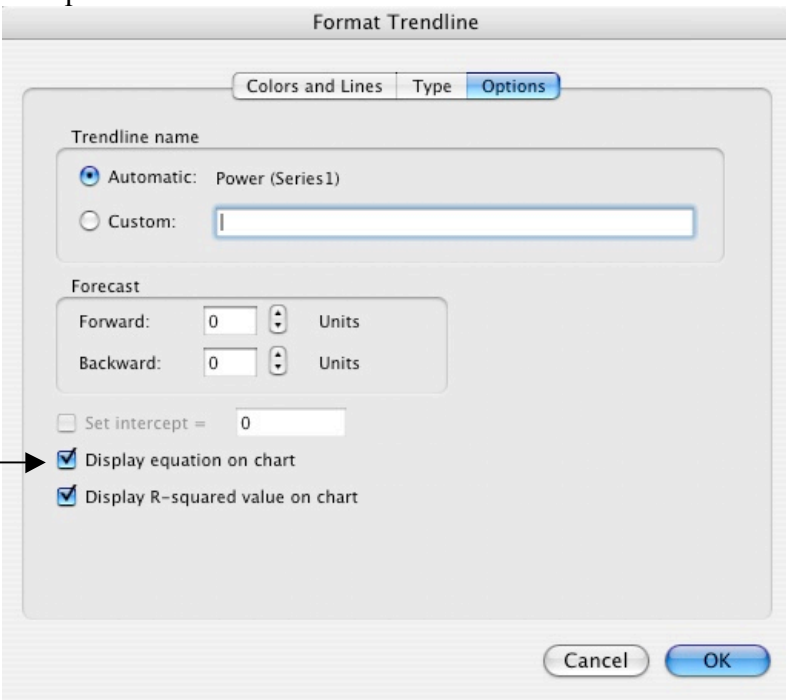


trendline!

13. When you find a trend line that fits well, place your cursor over the line, Control-click, and choose “Format Trendline” from the drop-down menu.



14. Click on the “Options” tab, and click on the “Display equation on chart” and “Display R-squared value on chart” at the bottom of the



The image shows the 'Format Trendline' dialog box with the 'Options' tab selected. The 'Trendline name' section has 'Automatic: Power (Series1)' selected. The 'Forecast' section has 'Forward' and 'Backward' both set to 0 units. The 'Set intercept = 0' checkbox is unchecked. The 'Display equation on chart' and 'Display R-squared value on chart' checkboxes are both checked. An arrow points to the 'Display equation on chart' checkbox. The 'OK' button is highlighted in blue.

Format Trendline

Colors and Lines Type Options

Trendline name

☒ Automatic: Power (Series1)

☐ Custom:

Forecast

Forward: 0 Units

Backward: 0 Units

☐ Set intercept = 0

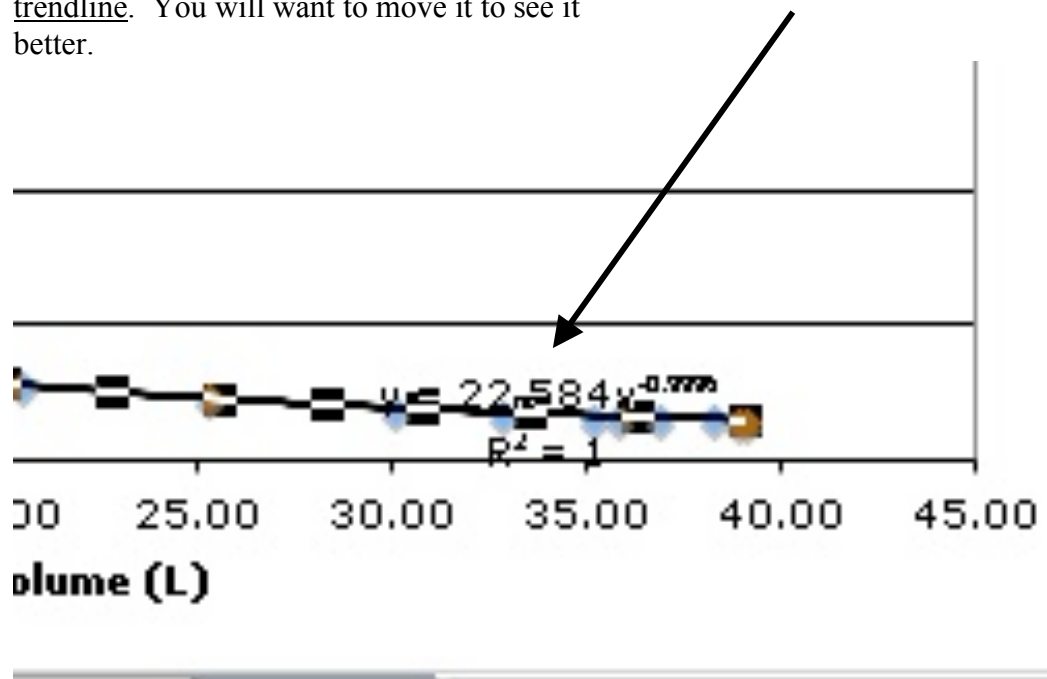
☒ Display equation on chart

☒ Display R-squared value on chart

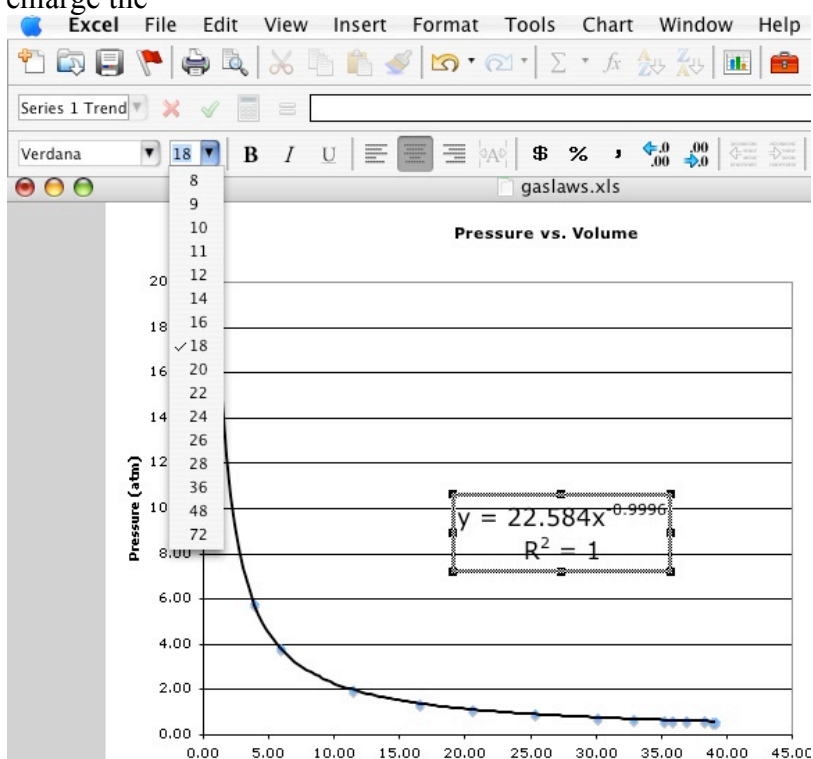
Cancel OK

window.

15. Your resulting equation will appear as small text partially hidden behind the trendline. You will want to move it to see it better.

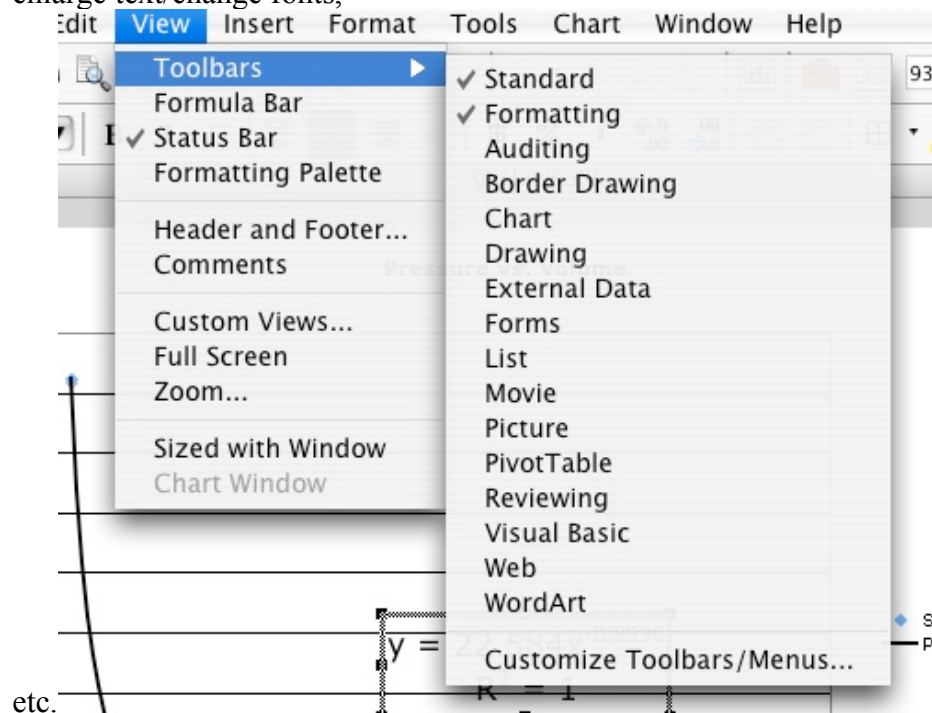


16. Click on the equation and drag it to an area of the graph where you can read it, and enlarge the



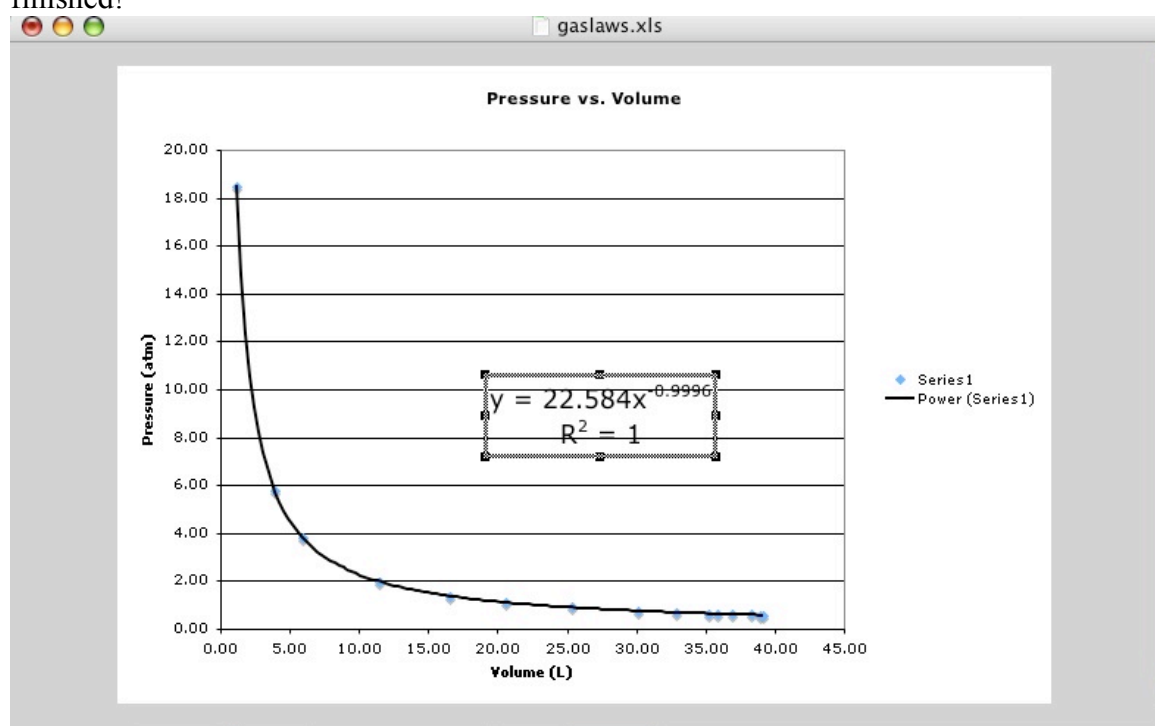
text.

17. Make sure the “Standard” and “Formatting” toolbars are visible so you can enlarge text/change fonts,



etc.

18. Now your graph is finished!

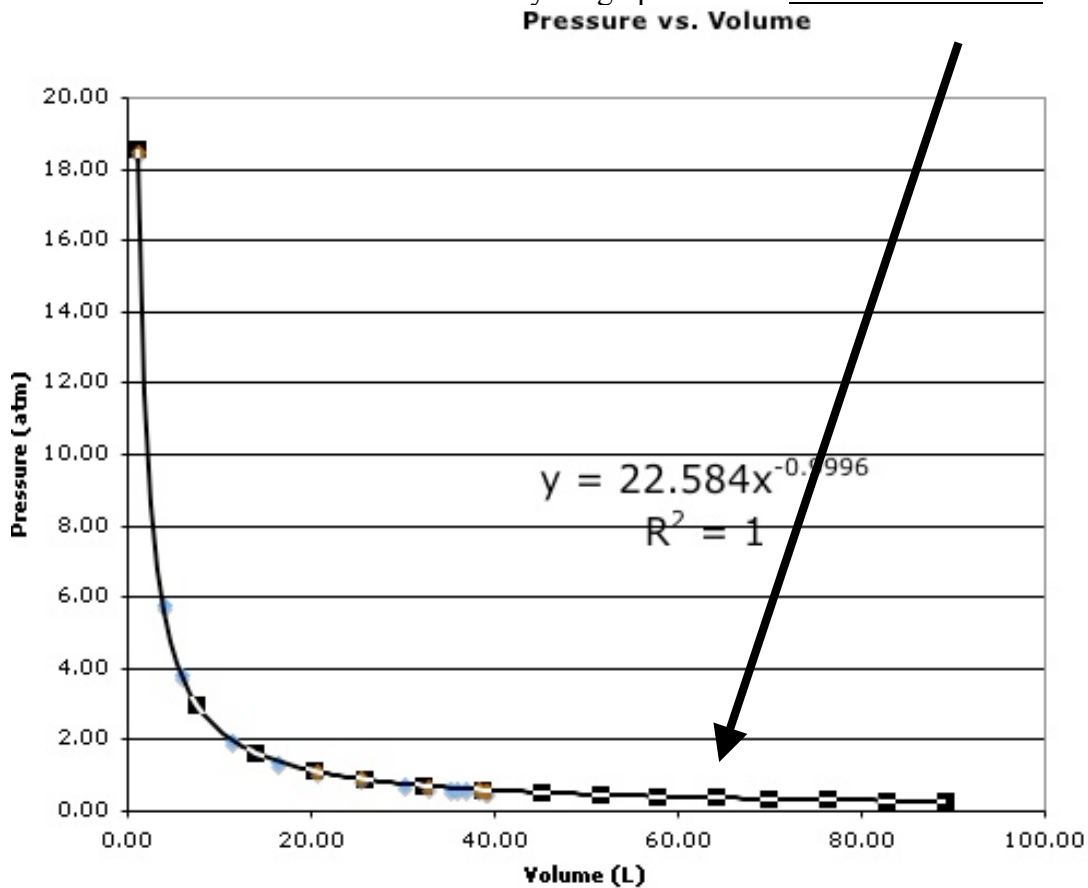


FORECASTING A TREND LINE:

19. If you need to read X or Y values that are off the axes of your graph, you can forecast the trendline on your graph forwards or backwards to reach those values. How to do: Control-click on your trendline and choose “Format Trendline.” Then, under “Options,” you can forecast forwards or backwards however many units are needed. Then click “OK.”

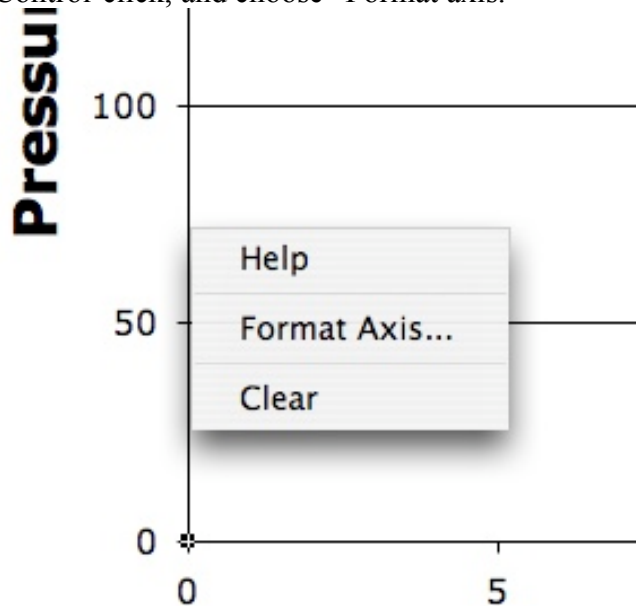
The Format Trendline dialog box, Options tab, is shown. The Trendline name is set to Automatic: Power (Series1). The Forecast section shows Forward: 50 Units and Backward: 0 Units. The Set intercept = 0 checkbox is unchecked. The Display equation on chart and Display R-squared value on chart checkboxes are checked.

20. You should then be able to view your graph with the forecasted trendline:

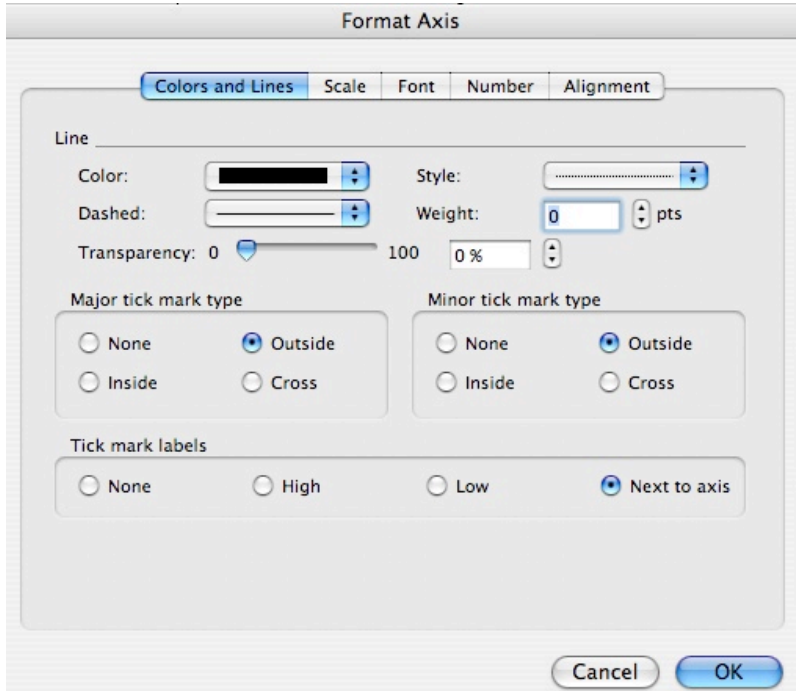


FORMATTING AXES

21. You can change the numbering system on your axes and add extra tickmarks to your axes by formatting each axis. Put your cursor on the axis you want to format and Control-click, and choose “Format axis.”

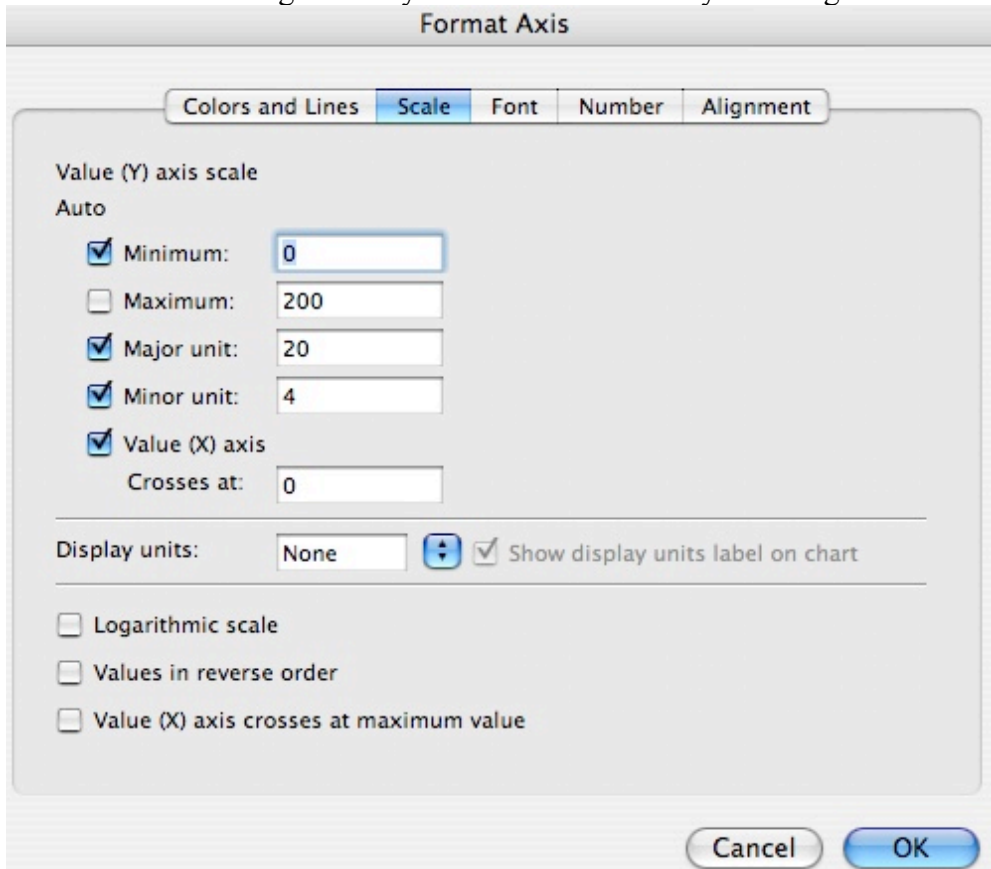


22. You can choose to add additional tickmarks to your scale by clicking on the “Colors and Lines” tab and clicking on the “Minor tick mark type” button of your choice. You can also choose the manner in which the tick marks are labeled.



The image shows the 'Format Axis' dialog box with the 'Colors and Lines' tab selected. The 'Line' section includes options for Color (black), Style (solid), Dashed (unchecked), Weight (0 pts), and Transparency (0%). The 'Major tick mark type' section has radio buttons for None, Outside (selected), Inside, and Cross. The 'Minor tick mark type' section has radio buttons for None, Outside (selected), Inside, and Cross. The 'Tick mark labels' section has radio buttons for None, High, Low, and Next to axis (selected). At the bottom are 'Cancel' and 'OK' buttons.

23. You can change the way the axes are labeled by choosing the “Scale” tab.



The image shows the 'Format Axis' dialog box with the 'Scale' tab selected. The 'Value (Y) axis scale' section has an 'Auto' checkbox and several checked options: Minimum (0), Maximum (200), Major unit (20), Minor unit (4), and Value (X) axis (Crosses at: 0). The 'Display units' section has a dropdown set to 'None' and a checked checkbox for 'Show display units label on chart'. At the bottom are 'Cancel' and 'OK' buttons.

21. SAVE your Excel file to your student folder (You must have logged in with your student ID and password first) with a name that reflects the assignment and data, such as “Gas Laws” or “Density Lab.” DO NOT use the default name, which will be “Workbook1.xls” etc., because it doesn’t tell you what your file is all about! Make sure the drop-down box under your file name is opened so you can choose the correct path to your student folder:

